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## TABLE OF CONTENTS

LEONARD—The Astereae of Ohio.....	33
ADKINS—Some Ohio Heteroptera Records.....	58
CLAASSEN—Second Alphabetical List of the Lichens Collected in Several Counties of Northern Ohio.....	62

## THE ASTEREÆ OF OHIO.

EMERY C. LEONARD.

Mostly erect geophilous perennial or occasionally annual herbs with stems branching at the top or in a few cases scapose. Leaves alternate, sessile, petioled, or clasping. Flowers bisporangiate, carpellate, or staminate, on a common receptacle, forming heads subtended by an involucre of few to many bracts imbricated in one or more series. Pappus of capillary bristles, teeth, or scales, or sometimes wanting. Ray flowers present in most cases. Achenes glabrous or pubescent.

### SYNOPSIS OF THE ASTEREÆ.

- I. With yellow ray flowers or with rays absent (white in *Solidago bicolor*).
  1. Pappus of scales, not capillary bristles *Grindelia*.
  2. Pappus of capillary bristles with or without an outer series of shorter ones.
    - a. Pappus double, an inner series of capillary bristles and an outer series of short ones; heads large. *Chrysopsis*.
    - b. Pappus a single series of capillary bristles; heads small.
      - (1) Receptacle alveolate; rays mostly fewer than the disk flowers. *Solidago*.
      - (2) Receptacle fimbrillate; rays more numerous than the disk flowers; heads in a corymbose paniculate inflorescence. *Euthamia*.
- II. Ray flowers present, not yellow but some shade of pink, blue, purple, white or greenish.
  1. Pappus a crown of awns or none, never of typical capillary bristles.
    - a. Pappus none or a mere crown of minute bristles; receptacle conic. *Bellis*.
    - b. Pappus a crown of few awns; receptacle flat or convex. *Boltonia*.

2. Pappus of numerous capillary bristles.
  - a. Pappus a single series of capillary bristles.
    - (1) Bracts of the involucre two to many series.
      - (a) Involucre narrow, its bracts firm; rays few, white. *Sericocarpus.*
      - (b) Involucre turbinate or hemi-spherical, its bracts mostly thin; rays usually more numerous, white to purple. *Aster.*
    - (2) Bracts of the involucre mostly in one or two series; heads mostly long pedicled.
      - (a) Rays longer than the disk flowers. *Erigeron.*
      - (b) Rays not longer than the disk flowers; heads very small, paniced. *Leptilon.*
  - b. Pappus distinctly double, the outer series shorter than the inner.
    - (1) Leaves lanceolate-ovate to obovate; rays white. *Doellingeria.*
    - (2) Leaves narrowly linear; rays violet. *Ionactis.*

## KEY TO THE GENERA.

1. Ray flowers yellow. 2.
1. Ray flowers not yellow. 5.
2. Leaves punctate, linear or linear-lanceolate; heads small, corymbose, somewhat glutinous. *Euthamia.*
2. Leaves not punctate in our species. 3.
3. Pappus in 2 series, the inner of long, the outer of short somewhat chaffy bristles; stem leaves entire. *Chrysopsis.*
3. Pappus of nearly equal bristles; leaves mostly serrate or dentate. 4.
4. Pappus of 2-8 coarse deciduous bristles; heads large, sometimes glutinous. *Grindelia.*
4. Pappus of numerous capillary bristles; heads comparatively small, not glutinous. *Solidago.*
5. With single flowers on leafless scapes; pappus of the disk flowers none. *Bellis.*
5. Flowers on leafy stems, pappus present on the disk flowers. 6.
6. Pappus of the disk flowers 2-5 scale-like bristles. *Boltonia.*
6. Pappus of the disk flowers of numerous capillary bristles. 7.
7. Ray flowers 4-5. 8.
7. Ray flowers numerous or rarely none. 9.
8. Flowers in terminal cymose panicles. *Sericocarpus.*
8. Flowers in crowded clusters forming a spike or thyrsus. *Solidago* (bicolor).
9. Pappus in a single series. 10.
9. Pappus double, the outer series of short bristles. 11.
10. Bracts of the involucre imbricate in several series. *Aster.*
10. Bracts of the involucre in but 1 or 2 series. *Erigeron.*
11. Ray flowers inconspicuous, white; annuals. *Leptilon.*
11. Ray flowers conspicuous. 12.
12. Ray flowers 25-200, narrow, bracts of the involucre very narrow. *Erigeron.*
12. Ray flowers 8-15. 13.
13. Rays white; leaves lanceolate to oblong, pinnately veined. *Doellingeria.*
13. Rays violet; leaves narrow, one nerved; peduncles covered with bracts. *Ionactis.*

**Grindelia** Willd. Gum-plant.

Coarse perennial or biennial herbs with smooth stems, branched above and sometimes woody below. Leaves alternate, sessile or clasping, mostly spinulous dentate. Heads either large and solitary at the ends of the branches; involucre hemispherical, its bracts with green points and imbricated in several series; ray and disk flowers yellow. Pappus of 2-8 deciduous bristles. Achenes short and glabrous.

1. **Grindelia squarrosa** (Pursh) Dun. Broadleaf Gum-plant. An erect plant, 6 in.-2 ft. high. Leaves oblong to oblong-spatulate, obtuse, more or less clasping at the base, sharply spinulose dentate,  $\frac{1}{2}$ - $1\frac{1}{2}$  in. long and  $\frac{1}{4}$ - $\frac{1}{2}$  in. wide. Heads  $\frac{3}{4}$ - $1\frac{1}{4}$  in. broad, glutinous; involucre bracts linear-lanceolate; rays sometimes absent. In dry soil. June to September. Hamilton County. From the west.

**Chrysopsis** (Nutt.) Ell. Golden-aster.

Branching perennial or sometimes biennial wooly or hairy fall flowering herbs with alternate, sessile, entire or slightly serrate leaves. Heads rather large and generally solitary at the ends of the branches; involucre hemispherical, of linear bracts imbricated in several rows, the outermost being the shortest; both ray and disk flowers yellow; ray flowers carpelate; disk flowers bisporangiate or only staminate. Pappus double, the outer series of short chaffy scales, the inner series of long capillary bristles. Achenes flattened, oblong-linear or obovate, pubescent.

1. Leaves parallel-veined, lower stem leaves, elongate-linear, entire; involucre campanulate. *C. graminifolia.*
1. Leaves pinnately-veined, lower stem leaves oblong-lanceolate, slightly serrate; involucre hemispherical. *C. mariana.*

1. **Chrysopsis graminifolia** (Mx.) Ell. Grassleaf Golden-aster. Slender pubescent plants corymbosely branched above. Leaves grasslike, shining, 3-5 nerved, entire, the basal leaves 4-12 in. long,  $\frac{1}{3}$ - $\frac{1}{2}$  in. wide, stem leaves smaller, the uppermost reduced to erect awl-shaped bracts. Heads several or numerous, about  $\frac{1}{2}$  in. broad; bracts of the involucre glabrate. In dry soil. August to October. No specimens.

2. **Chrysopsis mariana** (L.) Nutt. Maryland Golden-aster. Stout herbs 1-2 $\frac{1}{2}$  ft. high, pubescent with silky hairs when young, becoming smooth with age, corymbosely branched above. Lower stem leaves oblanceolate to spatulate, narrowed into a petiole, 2-4 in. long and mostly 1 in. wide; upper leaves oblong to lanceolate, sessile, 1-2 in. long. Heads numerous,  $\frac{2}{3}$ -1 in. broad, on glabrous peduncles; bracts of the involucre acute, glandular, viscid-pubescent. Dry soil. August to September. Hocking, Jackson.

**Solidago L. Goldenrod.**

Perennial herbs with simple or little branched stems, often somewhat woody at the base. Leaves alternate, toothed or entire. Some species with nodding tips. Heads several in a terminal or axillary panicle, thyrsus, or cymose, corymbose or capitate cluster; involucre oblong or narrowly campanulate, of appressed bracts imbricated in several series, the outer successively shorter; both ray and disk flowers yellow or rarely white; disk flowers mostly bisporangiate, ray flowers sometimes carpellate. Pappus of simple even capillary bristles.

## KEY TO THE SPECIES.

1. Heads in axillary clusters, in a terminal spike-like thyrsus, in a typical thyrsus either with normal or secund branches; not flat-topped. 2.
1. Heads in a terminal corymbiform or thyrroid cyme forming a flat-topped inflorescence. 20.
2. Heads in axillary clusters along the stem or the upper forming a spike-like or somewhat branched thyrsus. 3.
2. Heads in a terminal thyrsus or panical either simple or much branched, often secund. 8.
3. Involucre bracts with prominently spreading herbaceous tips. *S. squarrosa*.
3. Involucre bracts without spreading tips, wholly appressed. 4.
4. Rays white; lower leaves mostly obtuse, more or less pubescent. *S. bicolor*.
4. Rays yellow. 5.
5. Stem densely pubescent; ovulary glabrous. *S. hispida*.
5. Stem glabrous or sparingly pubescent. 6.
6. Stem leaves broadly ovate, acuminate, sharply and coarsely serrate, sometimes glabrous; ovulary pubescent. *S. flexocialis*.
6. Stem leaves lanceolate, or ovate-lanceolate. 7.
7. Stem leaves acuminate, lanceolate; ovulary pubescent. *S. caesia*.
7. Stem leaves merely acute, broadly lanceolate or oblong-lanceolate; ovulary glabrous or nearly so. *S. erecta*.
8. Heads in a slender more or less wand-like thyrroid panicle, not secund on the branches or only slightly so; leaves not triple veined. 9.
8. Heads in a large usually dense panicle, secund on its slender or recurved branches. 11.
9. Inflorescence an oblong thyrsus; growing in bogs and on wet shores. *S. uliginosa*.
9. Inflorescence a pyramidal or thyrroid panicle with numerous erect racemes; upland species. 10.
10. Lower leaves ovate to broadly oval, serrate. *S. speciosa*.
10. Lower leaves lanceolate to oblong-lanceolate, entire. *S. rigidiuscula*.
11. Leaves triple nerved with a pair of lateral veins much stronger than the others. 12.
11. Leaves not triple nerved. 14.
12. Leaves rather narrowly lanceolate, the two lateral veins very prominent. 13.
12. Leaves oblanceolate or spatulate-oblong, the 2 lateral veins obscure; stem very pubescent at the base. *S. nemoralis*.
13. Stem minutely pubescent above; involucre less than  $\frac{1}{8}$  in. high. *S. canadensis*.
13. Stem glabrous throughout except in the inflorescence, often glaucous; involucre more than  $\frac{1}{8}$  in. high. *S. serotina*.
14. Stem densely pubescent; leaves more or less so. 15.
14. Stem glabrous or merely pubescent above. 16.
15. Leaves rugose-veiny beneath, sharply serrate, oval to oblong-lanceolate. *S. rugosa*.
15. Veins not prominent; leaves sometimes more or less triple nerved, somewhat serrate, oblanceolate to spatulate-oblong. *S. nemoralis*.

16. Leaves very rough on the upper surface, serrulate; stem strongly angled. *S. patula.*
16. Leaves minutely roughened on the upper surface; stems terete or nearly so. 17.
17. Main branches of the inflorescence few, usually leafy-bracted at the base, widely divergent, very slender. *S. ulmifolia.*
17. Main branches of inflorescence numerous, rather crowded, spreading, recurved or ascending. 18.
18. Leaves firm, tapering gradually to the base, the uppermost chiefly entire. 18.
18. Leaves thin, the lower and middle stem leaves rather abruptly narrowed to a petiole; basal leaves mostly serrate. *S. arguta.*
19. Leaves ovate-lanceolate or oblong-lanceolate; panicle usually longer than broad; rays 2-8. *S. neglecta.*
19. Leaves lanceolate or oval-lanceolate; panicle usually as broad as high; rays 8-12. *S. juncea.*
20. Leaves ovate-oblong, mostly rough on both sides; flowers comparatively large. *S. rigida.*
20. Leaves lanceolate or oblong-lanceolate, glabrous or nearly so; flowers comparatively small. 21.
21. Leaves oblong-lanceolate, serrulate. *S. ohioensis.*
21. Leaves lanceolate or narrowly lanceolate, entire. *S. riddellii.*

1. **Solidago squarròsa** Muhl. Stout Goldenrod. Stem stout, simple, or rarely branched, glabrous, mostly pubescent above, 2-5 ft. high. Leaves glabrous or slightly pubescent, the lower and basal ones ovate, oval, or broadly spatulate, acute or obtuse, 1-4 in. wide; the upper leaves oblong, sessile, acute, entire or slightly toothed. Heads numerous, in a narrow terminal often leafy thyrus, sometimes 12 in. long; rays 10-16, showy; involucre bracts green with acute or obtuse, usually strongly recurved tips. Achenes glabrous. In rocky soil. August to September. Ashtabula, Lake, Cuyahoga.

2. **Solidago caesia** L. Wreath Goldenrod. A plant with a round, slender, glabrous, often glaucous, blue or purplish stem, branched or simple, 1-3 ft. high. Leaves lanceolate to oblong-lanceolate, sessile, acuminate at the apex, narrowed at the base, glabrous, sharply serrate, 3-5 in. long,  $\frac{1}{4}$ - $1\frac{1}{4}$  in. wide. Heads in axillary clusters or racemes, often forming a stout terminal thyrus; involucre bracts obtuse and appressed. Achenes pubescent. Woods and thickets. August to October. General.

3. **Solidago flexicàulis** L. Zig-zag Goldenrod. Stem glabrous, angled, zig-zag, usually simple. Leaves thin, ovate, acuminate at the apex, narrowed at the base into margined petioles, pubescent or glabrous beneath, sharply serrate, 2-7 in. long, 1-4 in. wide, the upper-most often lanceolate and entire. Heads in stout axillary clusters or rarely in a narrow terminal thyrus; bracts of the involucre obtuse to acute, appressed. Achenes hirsute-pubescent. In rich woods. July to September. Eastern Ohio, as far west as Cuyahoga, Fairfield, Jackson and Lawrence Counties; also in Ottawa County.

4. **Solidago bicolor** L. White Goldenrod. Stem rather stout, hirsute-pubescent, sometimes glabrous, simple, or branched,  $\frac{1}{2}$ –4 ft. high. The basal and the lower leaves obovate to broadly oblong, mostly obtuse, narrowed into long margined petioles, dentate to dentate-crenulate, sometimes pubescent, 2–6 in. long, 1–2 in. wide; the upper leaves smaller, oblong to lanceolate, often acute, mostly sessile and entire. Heads crowded into a narrow terminal thyrsus, 2–7 in. long or clustered in the upper axils; involucral bracts whitish, obtuse; rays white. Achenes glabrous. In dry soil. July to September. Columbiana, Geauga, Cuyahoga, Summit, Wayne, Erie, Fairfield, Vinton, Jackson, Lawrence.

5. **Solidago hispida** Muhl. Hairy Goldenrod. Stem densely pubescent or hirsute, simple or branched,  $1\frac{1}{2}$ –3 ft. high. The lower and basal leaves oval, obtuse or acute, petioled, pubescent on both sides, mostly dentate, 2–5 in. long, 1–2 in. wide; the upper leaves smaller, oblong, sessile, acute, dentate or entire. Heads crowded in a dense terminal thyrsus, also often in racemose clusters in the upper axils; involucral bracts yellowish, obtuse. Achenes with a few appressed hairs or glabrous. In dry soil. August and September. Ottawa, Lake.

6. **Solidago erécta** Pursh. Slender Goldenrod. A slender rarely branched plant, 2–3 ft. high, glabrous or pubescent above. Leaves firm, glabrous on both sides; ciliolate on the margins; the lower and basal leaves oblong to oval, obtuse, crenate-dentate, the upper lanceolate to oblong lanceolate, acute and usually entire. Heads in a narrow terminal thyrsus, sometimes with a few clusters in the upper axils; rays light yellow; bracts of the involucre obtuse. In dry soil. August–September. Fairfield, Hocking, Meigs.

7. **Solidago uliginòsa** Nutt. Bog Goldenrod. A rather stout plant with simple glabrous stem, 2–4 ft. high with the branches of the inflorescence somewhat pubescent. Leaves oblong-lanceolate to lanceolate, firm, glabrous, mostly ciliolate or scabrous on the margins, few-veined, acute to acuminate, the lower and basal ones 4–9 in. long,  $\frac{1}{2}$ – $1\frac{1}{2}$  in. wide, somewhat serrate and narrowed into petioles; the upper, smaller, sessile and entire. Heads in a terminal, oblong, dense thyrsus with appressed branches; bracts of the involucre linear-oblong, obtuse. Achenes glabrous. August–September. In swamps and bogs. Lucas, Portage, Stark, Wayne, Licking, Franklin.

8. ***Solidago speciosa*** Nutt. Showy Goldenrod. Plants with stout stems, glabrous below and often rough above, 3-7 ft. high. Leaves firm and glabrous, the lower and basal ones ovate to broadly oval, 4-10 in. long, 1-4 in. wide, acute to obtuse at the apex and long petioled, dentate, pinnately-veined; the upper smaller, oblong to oval, acute at both ends, crenate-dentate or entire, sessile or short petioled, rough margined. Heads in a large terminal thyrsus of ascending, often leafy branches; bracts of the involucre oblong and very obtuse. Achenes glabrous or slightly pubescent. In rich woods. August-September. Lucas, Franklin, Fairfield and Lawrence.

9. ***Solidago rigidiúscula*** (T. & G.) Port. Slender Showy Goldenrod. Stem rather slender, glabrous below and rough pubescent above, simple, 2-4 ft. high. Leaves lanceolate to ovate-lanceolate, entire or the basal ones often crenate, strongly ciliolate on the margins, 1-5 in. long,  $\frac{1}{4}$ -1 in. wide, sessile or the lower often narrowed to petioles. Heads generally in a narrow dense, simple or branched thyrsus. In dry soil. August-October. Erie, Wyandot, Wood, Lucas, Fulton.

10. ***Solidago rugosa*** Mill. Wrinkle-leaf Goldenrod. Stout scabrous hirsute plants, 1-7 $\frac{1}{2}$  ft. high, simple or often branched at the top. Leaves scabrous or pubescent, oval, oblong-lanceolate or ovate-lanceolate, acute, acuminate or sometimes obtuse at the apex, narrowed or obtuse at the base, rugosely veined on the lower surface, serrate, 1-4 in. long,  $\frac{1}{4}$ -1 $\frac{1}{2}$  in. wide, sessile or the lower tapering into petioles. Heads secund on spreading or recurving often leafy branches of usually a very large panicle; bracts of the involucre linear, obtuse. Achenes pubescent. In dry woods. July-November. Rather general.

11. ***Solidago pátula*** Muhl. Roughleaf Goldenrod. A stout rigid plant with usually a simple stem, glabrous below and very rough above, pinnate-veined; the lower and basal ones very large, 3-16 in. long, 1 $\frac{1}{2}$ -5 in. wide, oval to elliptical, narrowed to margined petioles; the upper similar, oval to oblong, sessile, acute, slightly serrate or entire. Heads secund on widely spreading and recurving branches of a loose panicle. Rays small; bracts of the involucre linear-oblong, obtuse. Achenes pubescent. In swamps. August to September. Rather general.

12. ***Solidago ulmifolia*** Muhl. Elmleaf Goldenrod. A very slender glabrous or puberulent plant, 2-4 ft. high, simple or with arched puberulent branches. Leaves thin, oblong to elliptical-lanceolate, acute or acuminate at the apex and base, sharply serrate, pinnately veined, slightly pubescent, the lower and basal ones wider, 3-5 in. long, 1-1½ in. wide, narrowed to margined petioles, the upper smaller and sessile. Heads secund on the usually few elongated and often leafy branches of the panicle; ray flowers small, deep yellow; bracts of the involucre oblong-lanceolate, obtusish. Achenes pubescent. In woods and copses. July-September. Rather general.

13. ***Solidago neglecta*** T. & G. Swamp Goldenrod. Stem glabrous or slightly rough above, simple, rather stout, 2-4 ft. high. Leaves firm, the lower and basal ones lanceolate to oblong-lanceolate, large, sometimes 12 in. long, acute, closely serrate or serrulate, tapering to margined petioles, rough on the margins; the upper smaller, lanceolate, acute, sessile, serrate or nearly entire. Heads more or less secund on the short branches of the thyrsoid panicle; rays 3-8, small; bracts of the involucre thin, linear, obtuse. Achenes glabrous or nearly so. In swamps and bogs. August-September. Wood, Madison, Fairfield.

14. ***Solidago júncea*** Ait. Plume Goldenrod. Stem glabrous or nearly so throughout, rigid, rather stout, single or branched at the top, 1½-4 ft. high. Leaves glabrous or rough, lanceolate to oval-lanceolate, acute to acuminate, serrate or entire, the upper ones smaller and sessile. Heads secund on the recurved, branches of the usually spreading panicle; rays 7-12, small; bracts of the involucre oblong to ovate-oblong, obtuse or acute. Achenes glabrous or sparingly pubescent. In dry or rocky soil. June-November. Rather general.

15. ***Solidago argûta*** Ait. Cut-leaf Goldenrod. Stem simple, rather stout, glabrous or sparingly pubescent above, 2-4 ft. high. Leaves thin, pinnately veined, the lower and basal ones broadly ovate-oval, short-acuminate, 3-16 in. long, 1-5 in. wide, narrowed to margined petioles or subcordate, sharply and coarsely serrate; the upper leaves smaller, sessile, ovate to oblong, acute or acuminate, more or less serrate. Heads secund on the lateral racemose branches of the terminal often leafy panicle; rays 5-7, large; bracts of the involucre oblong, obtuse. Achenes glabrous or nearly so. In rich woods. July to October. Erie County.



16. **Solidago canadensis** L. Canada Goldenrod. Slender glabrous or pubescent plants, 1-5 ft. high. Leaves 3-nerved, linear-lanceolate, 2-5 in. long,  $\frac{1}{4}$ - $\frac{1}{2}$  in. wide, entire or serrate with somewhat appressed teeth, acuminate at the apex, narrowed at the base, sessile, or the lower petioled, glabrous or pubescent. Heads secund on the spreading branches of the often large panicle; rays 4-6, short; bracts of the involucre thin, linear, acutish. Achenes small and glabrous. Hillsides, thickets and banks of streams. August to October. General and abundant.

17. **Solidago serótina** Ait. Late Goldenrod. A stout glabrous often glaucous plant, 3-8 ft. high. Leaves lanceolate to oblong-lanceolate, thin, the lowest petioled, glabrous on both sides or pubescent beneath, more or less rough-margined, 3-6 in. long,  $\frac{1}{8}$ - $\frac{1}{4}$  in. wide, acuminate at the apex, narrowed at the base. Heads crowded on the spreading or recurved branches of the usually long leafy, often puberulent panicles; rays 7-15, rather large; bracts of the involucre oblong, thin and obtuse. Achenes finely puberulent. In moist soil. August to September. General.

18. **Solidago nemoralis** Ait. Gray Goldenrod. A slender erect, or sometimes depressed and prostrate ash-gray plant,  $\frac{1}{2}$ -2 ft. high, finely and densely pubescent. Leaves thin, roughened, the basal and lower ones ovate-lanceolate or spatulate, petioled, obscurely triple-nerved, obtuse to acute, crenate-dentate, 3-6 in. long,  $\frac{1}{3}$ -1 in. wide; the upper becoming gradually smaller, oblanceolate or linear-oblong acute or entire; heads secund on the spreading or recurving branches of the terminal usually one-sided panicle; rays 5-9; bracts of the involucre linear-oblong. Achenes pubescent. In dry soil. July-November. General.

19. **Solidago rígida** L. Stiff Goldenrod. A stout simple or branched plant with densely and finely, pubescent, hoary stem, often becoming glabrous below with age. Leaves thick, flat, rigid, ovate to oblong, obtuse, pinnately veined, roughened on both sides or usually only beneath; the lower and basal long-petioled, sometimes 1 ft. long and 3 in. wide, entire or serrulate; the upper sessile, clasping and rounded or sometimes narrowed at the base, 1-2 in. long. Heads many-flowered, in a dense terminal compound corymb, the clusters sometimes slightly secund; rays 6-10, large; involucre broadly campanulate with oblong obtuse bracts, the outer ones pubescent. Achenes

glabrous, 10-15-nerved. In dry, gravelly, sandy, or rocky soil. August to October. Erie, Ottawa, Lucas, Defiance, Auglaize, Madison, Franklin, Lawrence.

20. **Solidago ohioensis** Ridd. Ohio Goldenrod. A very smooth, simple-stemmed plant, 2-3 ft. high. Leaves firm, pinnately veined, flat; the lower and basal ones elongate-lanceolate, or oblong-lanceolate, obtuse, long-petioled, serrulate the end or towards entire, often 1 ft. long; the upper smaller; those of inflorescence often bract-like. Heads 15-25 flowered, numerous, in a terminal compound corymb; rays 6-9, small; bracts of the narrow campanulate involucre oblong, obtuse and glabrous. Achenes glabrous, 5-nerved. August to September. Stark, Erie, Wyandot, Franklin, Champaign, Clark, Montgomery.

21. **Solidago riddellii**, Frank. Riddell's Goldenrod. A stout plant, glabrous or slightly pubescent above, 1-3 ft. high. Leaves numerous, thick, glabrous, entire, acute at each end; the lower and basal ones long-petioled, elongate, lanceolate, somewhat triple-nerved, conduplicate, often 1 ft. long,  $\frac{1}{3}$ - $\frac{7}{8}$  in. wide; the upper smaller, sessile, usually clasping at the base, conduplicate and somewhat falcate. Heads 20-30 flowered, numerous, in a dense corymb; rays 7-9, narrow; bracts of the oblong-campanulate involucre broadly oblong to obtuse. Achenes 5-nerved, glabrous. August to September. Lucas, Fulton, Wyandot, Franklin, Madison, Clark.

### **Euthamia** Nutt. Fragrant Goldenrod.

Perennial herbs with corymbosely branched stems. Leaves linear to linear-lanceolate, entire, sessile, punctate, 1-5-nerved. Heads very numerous and small. Clustered in a large, corymbose, convex-topped inflorescence; bracts of the involucre obtuse, sometimes glutinous, appressed, imbricated in several series; ray-flowers carpellate and small; disk-flowers bisporangiate. Pappus of simple even capillary bristles. Achenes villous-pubescent.

1. Leaves distinctly 3-5-nerved; heads 20-27 or more flowered. *E. graminifolia*.
1. Leaves 1-nerved, with a pair of indistinct lateral ones; heads rarely over 20-flowered. *E. tenuifolia*.

1. **Euthamia graminifolia** (L.) Nutt. Bushy Fragrant Goldenrod. A paniculately much branched or rarely simple plant, glabrous or roughish-pubescent, 2-4 ft. high. Leaves numerous, linear-lanceolate, acute to acuminate at both ends,

1-5 in. long, about  $\frac{1}{8}$  in. wide, 3-5-nerved, rough pubescent on the margins and nerves of the underside. Heads sessile in glomerules, arranged in a flat-topped corymb; ray flowers 12-20; disk flowers 8-12; bracts of the ovoid-campanulate or subcylindrical involucre yellowish, oblong to oblong-lanceolate, slightly viscid. In moist fields and roadsides. July to September. General.

2. **Euthamia tenuifolia** (Pursh) Greene. Slender Fragrant Goldenrod. Slender, glabrous, somewhat resinous plants, branched above, 2-4 ft. high. Leaves narrowly linear, entire, acuminate, sessile, narrow at the base, 1-nerved or with a pair of faint lateral nerves, punctate with minute resinous ducts, 1-16 -  $\frac{1}{4}$  in. wide, with often smaller ones crowded in the axils. Heads in glomerules forming a dense nearly flat-topped corymb; rays 6-12; disk flowers 4-6; bracts of the oblong-campanulate involucre oblong. In dry, sandy soil. August to October. Erie, Lucas, Cuyahoga, Lake.

### **Béllis** (Tourn) L. Daisy.

Tufted herbs with scapose or branched stems. Heads rather large and solitary at the ends of the scapes or branches, involucre hemispherical or broadly campanulate, of 1-2 series of nearly equal, imbricated, herbaceous bracts; ray flowers pink or white, carpellate; disk flowers yellow, bisporangiate. Pappus none or a ring of minute bristles.

1. **Bellis perennis** L. European Daisy. Small plants with one or more naked pubescent scapes, 1-7 in. high. Leaves basal, obovate, obtuse, slightly dentate, 1-2 in. long, narrowed to margined petioles, pubescent and hirsute. Heads  $\frac{1}{2}$ -1 in. broad; ray-flowers numerous, linear, white, pink, or purple; bracts of the involucre oblong, obtuse and usually purple. In waste places and occasionally spontaneous on lawns. April to November. Lake, Cuyahoga. From Europe.

### **Boltônia** L'Her. Boltonia.

Perennial herbs with striate or angled glabrous stems and alternate sessile, entire leaves. Heads rather large and numerous, paniculate or solitary on the ends of the branches. Involucre hemispherical or broadly campanulate, of scarious-margined bracts, imbricated in several series, the outer being somewhat shorter than the inner series; ray flowers carpellate;

disk flowers bisporangiate. Pappus a series of short scales with 2-4 long bristles.

1. **Boltonia asteroides** (L.) L'Her. Boltonia. A rather stout plant, 2-8 ft. high. Leaves lanceolate to oblong-lanceolate, sessile, 2-5 in. long,  $\frac{1}{4}$ -1 in. wide; the upper linear-lanceolate and smaller. Heads with white, pink, or purple rays; bracts of the hemispherical involucre lanceolate to oblong-lanceolate, acute or acuminate. Pappus of small bristly scales, often with 2-4 slender bristles nearly as long as the achene. Achenes obovate to oval. In moist soil. July to September. Erie, Ottawa, Lucas, Auglaize, Paulding, Defiance.

### **Sericocarpus** Nees. Whitetop Aster.

Perennial herbs with erect branching stems. Leaves alternate and sessile. Heads rather small, in terminal cymose panicles; involucre oblong-ovoid or campanulate, of coriaceous bracts with herbaceous or squarrose tips, imbricated in several series, the outer being the shorter, ray flowers white, carpellate; disk flowers mostly bisporangiate, often purplish. Pappus of many capillary bristles, the outer often shorter.

1. Leaves entire, linear, 3-nerved; stem striate, glabrous.

*S. linifolius.*

1. Leaves dentate, ovate to oblong, pinnately veined; stem not striate, pubescent to glabrate.

*S. asteroides.*

1. **Sericocarpus linifolius** (L.) B. S. P. Narrowleaf Whitetop Aster. Slender plants with glabrous striate stems 1-2 $\frac{1}{2}$  ft. high. Leaves linear to linear-spatulate, spreading, scabrous margined, faintly 3-nerved, thick, entire, obtuse at the apex, narrowed at the base, 1-2 in. long,  $\frac{1}{4}$  in. or less wide, sessile or the lower on short margined petioles. Heads clustered in 2's to 6's at the ends of the cymose branches; rays about  $\frac{1}{2}$  in. long; involucre about  $\frac{1}{4}$  in. high, its bracts oblong, obtuse, the outer with spreading green tips, the inner scarious, and often ciliolate at the apex. Pappus white. In dry, usually sandy soil. June-September. No specimens.

2. **Sericocarpus asteroides** (L.) B. S. P. Toothed Whitetop Aster. Stem pubescent or glabrate, slightly angled, 1-2 ft. high. Leaves pubescent or glabrous, ciliate, pinnately veined, faintly 3-nerved; the basal ones obovate or spatulate, dentate or entire, 2-4 in. long, 1-1 $\frac{1}{2}$  in. wide, narrowed to margined petioles; the upper smaller, oblong-lanceolate, dentate or entire, acute or obtuse. Heads densely clustered in a rather loosely corymbose

inflorescence. Involucre campanulate, its bracts oblong, ciliate, pubescent, the outer with green reflexed tips. Pappus brown or white. In dry woods. July–September. Cuyahoga, Summit, Wayne, Holmes, Fairfield, Hocking, Jackson, Gallia, Lawrence.

### Aster L. Aster.

Fall blooming herbs with branching stems, mostly perennial. Leaves alternate. Heads of various sizes forming a corymbose or paniculate inflorescence; involucre hemispherical, campanulate, or turbinate, of various kinds of bracts, imbricated in several rows, the outer usually shorter; ray flowers white, pink, purple, blue, violet or rarely yellow; disk flowers bisporangiate, usually yellow, becoming brown or purple. Pappus of numerous, slender bristles, scabrous or denticulate and mostly in one series. Achenes mostly flattened and nerved.

#### KEY TO THE SPECIES.

1. Lower stem and basal leaves cordate and definitely petioled. 2.
1. None of the leaves cordate and definitely petioled. 12.
2. Stem leaves cordate-clasping. *A. undulatus.*
2. Stem leaves petioled or sessile, not clasping. 3.
3. Rays white. 4.
3. Rays blue or violet. 5.
4. Leaves thick, rough; inflorescence glandular. *A. macrophyllus.*
4. Leaves thin, smooth, inflorescence not glandular. *A. divaricatus.*
5. Plant not glandular. 6.
5. Branches of the inflorescence glandular. *A. macrophyllus.*
6. Leaves entire or nearly so, thick and firm. 7.
6. Leaves mostly sharply serrate, thin. 8.
7. Leaves glabrous above or nearly so. *A. shortii.*
7. Leaves rough-pubescent on both sides; the upper bract-like. *A. azureus.*
8. Involucre  $\frac{1}{8}$ – $\frac{1}{4}$  in. high, bracts appressed, with conspicuously colored tips. 9.
8. Involucre  $\frac{1}{4}$ – $\frac{1}{2}$  in. high, bracts loose, without conspicuously colored tips. 10.
9. Cordate leaves mostly on smooth petioles, rough. *A. cordifolius.*
9. Cordate leaves mostly on winged petioles, smooth. *A. lowrieanus.*
10. Heads loosely paniculate or subcorymbose. *A. lindleyanus.*
10. Heads densely racemose-paniculate. 11.
11. Stem glabrous or nearly so. *A. sagittifolius.*
11. Stem densely short pubescent. *A. drummondii.*
12. Stem leaves or some of them with more or less clasping cordate bases, none of them both cordate and petioled. 13.
12. Stem leaves without cordate and clasping bases, sessile, or petioled. 22.
13. Stem rough or hirsute-pubescent. 14.
13. Stem glabrous or only sparingly pubescent above. 18.
14. Leaves or some of them serrate. *A. puniceus.*
14. Leaves entire. 15.
15. Heads  $\frac{1}{2}$ –1 in. broad; leaves large, slightly clasping. *A. oblongifolius.*
15. Heads 1–2 in. broad; leaves strongly cordate and clasping. 16.
16. Branchlets of the inflorescence glandular viscid; involucre hemispherical. *A. novæ-angliæ.*
16. Branchlets of the inflorescence not glandular viscid; involucre turbinate. 17.
17. Leaves thick and firm, very rough, oblong to oval. *A. patens.*
17. Leaves thin, roughish, oblong-lanceolate. 18.

18. Stem leaves sharply serrate. 19.  
 18. Stem leaves entire or nearly so. 21.  
 19. Leaves tapering to the base. *A. puniceus.*  
 19. Leaves not tapering to the base. 20.  
 20. Leaves abruptly contracted into margined petioles, often enlarged at the base. *A. prenanthoides.*  
 20. Leaves strongly cordate clasping, bracts green tipped. *A. laevis.*  
 21. Bracts of the involucre with rhomboid green tips. *A. laevis.*  
 21. Bracts of the involucre narrow, not foliaceous, leaves narrowly linear. *A. junceus.*  
 22. Involucral bracts without green tips, leaves narrow, entire. *A. paniculatus.*  
 22. Involucral bracts with green tips. 23.  
 23. Heads in more or less 1-sided racemes. 24.  
 23. Heads not in 1-sided racemes, mostly paniculate. 26.  
 24. Stem leaves oblong to lanceolate, serrate or mostly so. 25.  
 24. Stem leaves linear-lanceolate to linear, nearly entire; stem glabrate. *A. vimineus.*  
 25. Stem pubescent or glabrate. *A. lateriflorus.*  
 25. Stem villous; leaves narrowly lanceolate, thin. *A. hirsuticaulis.*  
 26. Involucral bracts appressed, acute. 27.  
 26. Involucral bracts spatulate, mostly ciliate, somewhat spreading, at least the outer obtuse; heads numerous. *A. multiflorus.*  
 27. Heads solitary at the end of very small leafy branches. *A. dumosus.*  
 27. Heads paniculate. 28.  
 28. Stem leaves lanceolate, serrate or entire. 29.  
 28. Stem leaves linear-lanceolate to lanceolate, mostly entire. 31.  
 29. Heads  $\frac{3}{4}$ – $\frac{7}{8}$  in. broad. 30.  
 29. Heads  $\frac{1}{2}$ – $\frac{3}{4}$  in. broad, stem leaves narrowly lanceolate. *A. tradescanti.*  
 30. Leaves firm, rough or roughish; rays often purplish; involucral bracts acute. *A. salicifolius.*  
 30. Leaves thin, smooth; rays chiefly white; involucral bracts acuminate. *A. paniculatus.*  
 31. Heads scattered,  $\frac{1}{2}$ – $\frac{3}{4}$  in. broad; the upper leaves linear. *A. faxoni.*  
 31. Heads numerous,  $\frac{1}{4}$ – $\frac{1}{2}$  in. broad; the upper leaves subulate. 32.  
 32. Stem smooth; leaves linear-lanceolate. *A. ericoides.*  
 32. Stem densely villous; leaves oblong-lanceolate to lanceolate. *A. ericoides* var. *platyphyllus.*

1. **Aster divaricatus**, L. White Wood Aster. Tufted plants with slender, assurgent, somewhat zig-zag stems,  $1\frac{1}{2}$ – $2\frac{1}{2}$  ft. high, becoming glabrate with maturity. Leaves thin, ovate-lanceolate, serrate with sharp spreading teeth, acuminate or acute at the apex and cordate at the base, on slender petioles; inflorescence leaves smaller, ovate and acute. Heads  $\frac{3}{4}$ –1 in. broad, in a flattish forked corymb of long slender divergent branches; rays 6–9, linear, white; disk turning brown; bracts of the involucre mostly obtuse, ciliate, with inconspicuous green tips, the outer short and oblong, the inner linear. In open woodlands and thickets, in rather dry soil. September–October. Meigs, Franklin, Fairfield, Lorain, Erie.

2. **Aster macrophyllus** L. Largeleaf Aster. Rough plants from long, thick rootstocks; stems reddish, smooth, often grandular-viscid in the inflorescence. 2–3 ft. high. Basal

leaves broad, cordate, with a large irregular sinus, thick, rough and harsh above; teeth broad curved and pointed, on long petioles; the upper leaves smaller and narrower, oblong, on short winged petioles; the uppermost sessile and acute. Heads about  $\frac{1}{2}$  in. high on rigid thickened peduncles forming a broadly corymbose irregular inflorescence; rays often 16, lavender or violet, rarely pale; bracts of the involucre conspicuously green-tipped, the outer short-ovate, the inner elongated and linear, sometimes roseate tinged on the margins. In moderately dry soil, in shaded places. August. Rather general; no specimens from the southwestern counties.

3. **Aster shórtii** Hook. Short's Aster. Slender plants paniculately branched above, with smooth or roughish stems, 2-4 ft. high. Leaves thick, smooth above, minutely pubescent beneath; the lower and basal ones ovate to ovate-lanceolate, acute to acuminate at the apex, cordate at the base, dentate or entire, 2-6 in. long, 1-2 in. wide, on slender petioles; the upper leaves lanceolate, entire, rounded at the base, sessile or on short petioles; inflorescence leaves small and bract-like. Heads numerous, rays 10-15, linear, violet blue,  $\frac{1}{2}$  in. or less long; bracts of the broadly companulate involucre linear, acute, pubescent, with green appressed tips, imbricated in several series. Pappus tawny. On banks and along edges of woods. September-October. From Franklin and Montgomery Counties southward; also in Lake and Ottawa Counties.

4. **Aster azùreus** Lindl. Azure Aster. Stem slender, stiff, rough, branched above, 1-4 ft. high. Leaves thick, entire, rough on both sides; the basal ones ovate to ovate-lanceolate, acute to obtuse at the apex, somewhat cordate at the base, on slender naked petioles; upper leaves tapering to short petioles or sessile, lanceolate or linear; inflorescence leaves reduced to small appressed bracts. Heads numerous; rays 10-20, bright blue; bracts of the turbinate involucre glabrous, linear-oblong, acute, imbricated in several series, with green appressed tips. Pappus tawny. Along borders of woods. August-October. Franklin, Wood, Fulton, Erie.

2 5. **Aster cordifólius** L. Common Blue Wood Aster. Bushy much branched plants with glabrous or rarely pubescent stems, 1-5 ft. high. Leaves thin, rough, often with scattered hair above and on veins beneath; lower and basal ones ovate-cordate, on slender scarcely winged petioles 2-5 in. long; the

upper smaller, ovate-lanceolate, sessile or on short petioles. Heads numerous, small; rays 10-20, bracts of the turbinate or cylindrical involucre linear, obtuse, green-tipped, appressed. Woods and thickets. September-December. Rather general.

6. **Aster lowrieanus** Port. Lowrie's Aster. Glabrous branched plants 1-4 ft. high. Leaves thickish, firm, often greasy to the touch; the basal ones on slender petioles, ovate to ovate-lanceolate, mostly cordate, acute or obtusish, serrate or increased, 2-6 in. long; stem leaves ovate to oblong, often cordate, on winged petioles; the uppermost lanceolate. Heads rather few, loosely paniced; ray flowers light blue; bracts of the turbinate involucre obtuse, appressed. In woods. September to October. Lake, Cuyahoga, Auglaize, Fairfield, Hamilton.

7. **Aster lindleyanus** T. & G. Lindley's Aster. Glabrous or sometimes pubescent plants, usually stout, 1-6 ft. high and branched above. Leaves rather thick, glabrous or slightly pubescent on the lower veins; basal ones acute or acuminate to the apex, cordate at the base, sharply serrate, ovate, on slender naked petioles; upper leaves ovate to ovate-lanceolate, serrate or entire, sessile or with margined petioles; inflorescence leaves smaller, linear-lanceolate. Heads often few; rays 10-20, blue or violet; bracts of the broadly turbinate or hemispherical involucre lanceolate, acute, rather loosely imbricated, glabrous or nearly so, with green tips. Pappus white. In open places. August to October. Wayne, Franklin.

8. **Aster drummondii** Lindl. Drummond's Aster. A stout finely and densely canescent plant, branched above and 2-5 ft. high. Leaves thin, ovate, acuminate, rough above and canescent below; the lower and basal ones cordate, on slender naked petioles, sharply toothed, 2-4 in. long; the upper cordate or rounded at the base, usually on margined petioles; those of the inflorescence smaller, sessile, entire or nearly so. Heads on racemose branches; rays 8-15, blue; bracts of the turbinate involucre linear, slightly pubescent, acute to acuminate, with green appressed tips. Pappus whitish. In dry soil, borders of woods and on prairies. September to October. Madison County.

9. **Aster sagittifolius** Willd. Arrowleaf Aster. Stout or slender herbs, glabrous or slightly pubescent above, 2-5 ft. high, with a paniculate inflorescence of ascending branches. Leaves



thin, slightly glabrous or roughened above, glabrous or pubescent below, the lower and basal ones cordate or sagittate, ovate, lanceolate, sharply serrate, acuminate, 3-6 in. long, on slender naked or narrowly margined petioles; the upper lanceolate, sessile or on short margined petioles, serrate or entire; inflorescence leaves very small. Heads crowded and racemose; rays 10-15, light blue or purplish; bracts more or less glabrous with slightly spreading green tips. Pappus whitish. In dry soil. August to October. Rather general.

- 3 10. **Aster undulatus** L. Wavy-leaf Aster. Plants with stiff, rough, pubescent stems, divergent above, 1-3½ ft. high. Leaves rough on both sides, pubescent beneath, dentate, undulate or entire, acute to acuminate, the lower and basal ones ovate, cordate, 2-6 in. long, on margined petioles; the middle ones ovate-lanceolate or oblong, with margined petioles dilated and clasping at the base; the upper sessile and clasping; those of inflorescence small and bract-like. Heads numerous and racemose, often secund on spreading branches; rays 8-15, pale blue to violet; bracts of the broadly turbinate involucre linear, oblong, pubescent, acute or acutish with appressed green tips. Pappus whitish. In dry soil. September to October. Wayne County.

11. **Aster patens** Ait. Late Purple Aster. Slender, rough, divergently branched plants, 1-3 ft. high. Leaves ovate-oblong to oblong-lanceolate, rough and somewhat rigid, strongly cordate or auriculate-clasping at the broad base, entire, acute, or the lowest obtuse, 1-3 in. long, those of the branches smaller and bract-like, the margins rough-ciliate. Heads 1 in. or more broad, solitary at the ends of the branches; rays 20-30, purplish or deep violet; bracts of the broadly turbinate involucre linear-oblong, finely pubescent and somewhat glandular, imbricated in several series, with spreading, green, acute tips. Pappus tawny. Achenes pubescent. In dry open places. August to October. Portage County.

12. **Aster phlogifolius** Muhl. Thinleaf Purple Aster. Plants resembling *Aster patens* Ait, but usually taller. Leaves larger, lanceolate to oblong-lanceolate, thin or membranous, acuminate at the apex, auriculate-clasping at the base, roughish above, pubescent beneath, usually narrowed below the middle, often 6 in. long. Heads usually numerous, 1-2 in. broad, paniced or racemose on the branches of the inflorescence; rays numerous,

purplish-blue; bracts of the involucre lanceolate, glabrate, somewhat loose, with herbaceous tips. In woods and thickets. August to September. Wayne and Portage.

- 4 13. *Aster novæ-angliæ* L. New England Aster. Stout leafy plants with hispid, pubescent stems, corymbosely branched above. Leaves lanceolate, entire, rather thin, acute, pubescent, 2-5 in. long,  $\frac{1}{2}$ -1 in. wide, clasping the stem by an auriculate or broadly cordate base. Heads numerous, 1-2 in. broad, clustered at the end of the branches; rays 40-50, linear, violet purple, rarely pinkish, red or white; bracts of the hemispherical involucre linear-subulate, rather unequal, spreading, pubescent; more or less glandular viscid. Pappus reddish-white. Achenes pubescent. In fields and swamps. August to October. General.

14. *Aster oblongifolius* Nutt. Aromatic Aster. Stem much branched, hirsute-pubescent, 1-2 $\frac{1}{2}$  ft. high. Leaves crowded, oblong to oblong-lanceolate, sessile by a broad partly clasping base, usually rigid, entire, acute or macronate at the apex, rough on both sides, rough-margined, stem leaves 1-2 in. long and  $\frac{1}{4}$  in. or less wide; those of the branches smaller. Heads 1 in. broad; corymbose on the divaricate or ascending branches; rays 20-30, violet purple, rarely rose-color; bracts of the hemispherical involucre much imbricated, glandular, aromatic, linear to linear-oblong, with green, acute, spreading tips. Pappus light brown. Achenes hoary with gray pubescence. On prairies and bluffs. August to October. No specimens.

- 5 15. *Aster puniceus* L. Purple-stem Aster. Stout reddish plants with hispid, rigid, hairy or glabrous stems, corymbosely branched above, 3-8 ft. high. Leaves lanceolate to oblong-lanceolate, acuminate, sessile, sharply serrate or entire, usually rough above, pubescent on the midrib or glabrous rough above, pubescent on the midrib or glabrous beneath, 3-6 in. long,  $\frac{1}{2}$ -1 $\frac{1}{2}$  in. wide. Heads usually many, 1-1 $\frac{1}{2}$  in. broad; rays 20-40, violet, purple or pale, rarely white, showy; bracts of the hemispherical involucre linear-oblong, alternate, imbricated in about 2 series, glabrous or ciliate, green, loose, spreading, nearly equal, sometimes broadened. Pappus nearly white. Achenes pubescent. In swamps. July to November. Rather general.

- 6 16. *Aster prenanthoides* Muhl. Crooked-stem Aster. Flexuous much-branched plants with the stem glabrous or pubescent in lines above, 1-2 ft. high. Leaves thin, oblong to ovate-lanceolate or lanceolate, sharply and coarsely serrate,

scabrous above, glabrous or nearly so beneath, 3-8 in. long,  $\frac{3}{4}$ -1 $\frac{1}{2}$  in. wide, acuminate at the apex, abruptly narrowed below to a broad margined entire petiole with an auriculate clasping base. Heads usually numerous, 1 in. or more broad; rays 20-30; violet; bracts of the hemispherical involucre acute, green, spreading, imbricated in 3-4 series, the outer shorter. Pappus tawny. Achenes pubescent. August to October. In moist soil. Rather general.

- 7 17. **Aster laevis** L. Smooth Aster. Stem usually stout, glabrous and often glaucous, 2-4 ft. high, branched or simple. Leaves entire or serrate, glabrous, slightly roughened on the margins, the basal and lower gradually narrowed to winged petioles, the upper sessile and usually clasping, lanceolate, oblong-lanceolate or ovate, acute or obtusish at the apex, 1-4 in. long,  $\frac{1}{4}$ -2 in. wide; those of the branches small and bract-like. Heads usually numerous, about 1 in. broad, in a close panicle; rays 15-30, blue or violet; bracts of the campanulate involucre rigid, ovate, appressed, green-tipped, imbricated in several series. Pappus tawny. Achenes glabrous or nearly so. Usually in dry soil. September to October. Rather general.

18. **Aster juncus** Ait. Rush Aster. Very slender simple or little branched herbs with stems glabrous or pubescent above, 1-3 ft. high. Leaves firm, glabrous, roughish margined, entire, or with a few distinct teeth, acute to acuminate at the apex, sessile by a broad clasping or slightly cordate base, 3-6 in. long,  $\frac{1}{8}$ - $\frac{1}{4}$  in. wide. Heads about 1 in. broad, rather distant, paniculate; rays violet to white; involucre hemispherical, its bracts glabrous, linear, very acute, imbricated in 3-4 series, the outer shorter. Pappus pale. In swamps and bogs. July-September. Licking, Wayne.

- 8 19. **Aster lateriflorus** (L.) Britt. Starved Aster. Stem pubescent or nearly glabrous, slender, divergently branched, 1-5 ft. high. Basal leaves ovate, slender petioled; stem leaves broadly lanceolate, or oblong lanceolate, acuminate, serrate, 2-5 in. long,  $\frac{1}{2}$ -1 in. wide; leaves of the branches smaller, oblong to linear-oblong. Heads  $\frac{1}{3}$ - $\frac{1}{2}$  in. broad, usually numerous, crowded short pedicled or sessile, arranged on the branches in onesided racemes; rays numerous, short, white or pale; disk flowers purple; bracts of the turbinate involucre obtuse to acutish, imbricated in about 4 series, with short, green, appressed

or with slightly spreading tips. Pappus white. Achenes slightly pubescent. In dry or moist soil. August to October. Rather general.

20. **Aster hirsuticaulis** Lindl. Rough-stem Aster. Stem slender, erect,  $1\frac{1}{2}$ –3 ft. high, pubescent nearly to the base. Leaves thin, glabrous above, usually pubescent on the midvein beneath, serrate, with a few appressed teeth, or entire, linear-lanceolate to lanceolate, often 6 in. long,  $\frac{1}{8}$ – $\frac{1}{2}$  in. wide, the sessile or basal ones spatulate and petioled. Heads more or less unilateral on the branches, densely or loosely clustered or sometimes few in the axils of the leaves; rays white; bracts of the involucre linear-lanceolate, acute or acuminate, imbricated in 3–4 series. In woods and thickets. August to October. Warren, Auglaize.

21. **Aster vimineus** Lam. Small White Aster. Slender bushy plants, divergently branched above, 2–5 ft. high. Stem leaves linear-lanceolate, entire or with a few fine sharp teeth in the middle, 3–5 in. long,  $\frac{1}{8}$ – $\frac{1}{4}$  in. wide, acuminate at the apex, narrowed to a sessile base; leaves of the branchlets much smaller. Heads very numerous, small, usually densely racemose-secund and short pedicled; rays numerous, white to purplish; bracts of the broadly turbinate involucre linear, acute, green-tipped, imbricated in 3 or 4 series. Pappus white. In moist soil. August to September. Wayne County.

22. **Aster multiflorus** Ait. Dense-flowered Aster. A much branched, bushy plant, rough pubescent or scabrous, 1–7 ft. high. Leaves rigid, sessile or slightly clasping, rough, ciliate; those of the stem  $\frac{1}{2}$  to  $1\frac{1}{2}$  in. long; those of the branches very small and crowded. Heads densely crowded, nearly sessile and often slightly secund on the branches; rays 10–20, white; involucre bracts coriaceous, ciliate or pubescent, imbricated in 3 or 4 series, with green obtuse or mucronate spreading tips. Pappus brownish. Achenes puberulent. In dry open places. August–November. Lucas, Erie, Gallia.

23. **Aster dumosus** L. Bushy Aster. Glabrous or nearly so throughout, rather stiff and viscid, usually paniculately branched, 1–3 ft. high. Leaves firm; the basal ones spatulate, dentate; those of the stem, linear to linear-lanceolate, entire, acute or obtuse, 1–3 in. long,  $\frac{1}{8}$ – $\frac{1}{4}$  in. wide, roughish margined, often reflexed, those of the branches very numerous, small and bract-like. Heads terminating the minutely leafy branches

and branchlets, usually numerous; rays 15-20, blue to pale violet or white; bracts of the broadly campanulate involucre linear subulate, obtuse or acutish, appressed, green-tipped imbricated in about 4 series. Pappus white. Achenes pubescent. Sandy soil. August-October. Erie County.

24. **Aster salicifolius** Lam. Willow Aster. A rather slender paniculately much branched, leafy plant, 2-5 ft. high, glabrous, roughish or pubescent above. Leaves firm, lanceolate to linear-lanceolate, roughish or rough margined, acute at the apex, sessile or slightly clasping at the base, entire or sparingly dentate, glabrous or nearly so. 2-4 in. long,  $\frac{1}{8}$ - $\frac{1}{2}$  in. wide, the lower sometimes petioled; those of the branches smaller. Heads numerous; rays numerous, violet, violet purple or sometimes white; bracts of the involucre linear-oblong, appressed, imbricated in 4-5 series, with acute or obtusish tips. Pappus white. Achenes pubescent. In moist soil. August-October. Wayne County.

9 25. **Aster paniculatus** Lam. Panicked Aster. A paniculately much branched plant with a glabrous or sometimes pubescent stem, 2-8 ft. high. Leaves lanceolate to linear-lanceolate, acuminate at the apex narrowed to a sessile or slightly clasping base, glabrous, roughish-margined; those of the stem slightly serrate or entire, 3-6 in. long,  $\frac{1}{4}$ - $\frac{1}{2}$  in. wide; the upper branch leaves gradually smaller. Heads numerous; rays numerous, white or faintly tinged with violet; bracts of the involucre linear-lanceolate, acuminate, appressed, green-tipped and imbricated in 4-5 series. Achenes minutely pubescent. In moist soil. August to October. General.

26. **Aster tradescánti** L. Tradescant's Aster. Stems slender, paniculately branched, 2-5 ft. high; the branches often pubescent in lines. Stem leaves linear-lanceolate to lanceolate, acuminate at the apex, narrowed to a sessile base, 3-6 in. long,  $\frac{1}{8}$ - $\frac{1}{2}$  in. wide, glabrous or nearly so on both sides, sharply serrate at the middle, or entire. Heads numerous and racemose on the branches; rays numerous, white or nearly so; bracts of the hemispherical involucre linear, acute, appressed, green-tipped, imbricated in 4-5 series. Pappus white. Achenes minutely pubescent. In fields and swamps. August to October. Rather general.

27. **Aster faxoni** Porter. Faxon's Aster. A rather stout glabrous plant, paniculately or corymbosely branched,  $\frac{1}{2}$ -5 ft.

high. Basal leaves oblong to spatulate, obtuse, dentate or entire; stem leaves lanceolate to linear-lanceolate, acute or acuminate at the apex, narrowed to a sessile base or a margined petiole, mostly entire, 2-5 in. long,  $\frac{1}{8}$ - $\frac{3}{8}$  in. wide, those of the branches gradually smaller. Heads rather few; rays numerous, bright white or rarely purplish; bracts of the hemispherical involucre linear-lanceolate, acute, green-tipped, imbricated in about 3 series, the outer shorter. Pappus white. Achenes minutely pubescent. On moist cliffs. August-September. Vinton County.

- 10 28. **Aster ericoides** L. White Heath Aster. Usually bushy paniculately branched plants with glabrous or hirsute stems, branchlets often secund. Leaves firm; the basal ones spatulate, obtuse, dentate, narrowed to margined petioles, glabrous or ciliate; stem leaves linear to linear lanceolate, acute entire, 1-3 in. long,  $\frac{1}{8}$ - $\frac{1}{4}$  in. wide; those of the branches bractlike and numerous. Heads very numerous; rays 15-25, white or tinged with rose, bracts of the campanulate or hemispherical involucre coriaceous, lanceolate, abruptly acute, green-tipped, imbricated in about 3 series. Pappus white. Achenes finely pubescent. In dry soil. September to December. General.

var. **Aster ericoides platyphyllus**, T. & G. A broad-leaved densely villous relative of *Aster ericoides* found in the western half of the state, east to Erie, Franklin and Meigs Counties.

29. **Aster ptarmicoides** (Nees.) T. & G. Upland White Aster. Slender tufted plants with rigid corymbosely branched stems, usually rough above, 1-2 ft. high. Leaves linear-lanceolate, 1-3 nerved, entire or with a few distant teeth, firm, shining, rough margined, acute, narrowed to a sessile base, or the lower petioled; the lower leaves 3-6 in. long,  $\frac{1}{8}$ - $\frac{1}{3}$  in. wide; the upper smaller and bract-like,  $\frac{3}{4}$ -1 in. broad; rays 10-20, white, bracts of the involucre linear oblong, obtuse, the outer acutish, appressed, nearly glabrous, green, imbricated in about 4 series. Pappus white. Achenes glabrous. In dry or rocky soil. July to September. (Ottawa County—Moseley Herbarium).

### **Erigeron** L. Fleabane.

Branching or scapose herbs with alternate or basal leaves. Heads solitary or in a naked corymbose pedunculate inflorescence, some species with nodding tips. Involucre hemispherical, cylindrical or campanulate, of narrow equal bracts imbricated in several series; ray flowers white or pink, bispor-

angiate; disk flowers yellow and bisporangiate. Pappus of slender scabrous or denticulate bristles in one series or sometimes a shorter additional outer series.

1. Heads 1-1½ in. broad, few; stem simple, pubescent. *E. pulchellus.*
1. Heads ½-1 in. broad, many; stem branched. 2.
2. Rays 100-150, mostly purple or violet. *E. philadelphicus.*
2. Rays considerably less than 100, white, sometimes purple tinged. 3.
3. Stem leaves linear lanceolate, the upper entire, the lower somewhat dentate. *E. ramosus.*
3. Stem leaves lanceolate, all but the extreme upper ones sharply serrate. *E. annus*

1. **Erigeron pulchellus** Mx. Showy Fleabane. Slender simple villous plants, perennial by stolons and offsets, 10-24 in. high. Basal leaves tufted, spatulate or obovate, somewhat wedgeshape at the base, narrowed into slender margined petioles, obtuse at the apex, 1-3 in. long, ½-2 in. wide, dentate, stem leaves partly clasping, oblong, lanceolate or ovate, acute, entire or slightly serrate. Heads 1-6, on slender peduncles; rays numerous, white or purple, ⅓-½ in. long; bracts of the depressed hemispherical involucre linear, acuminate, villous. Pappus simple. Achenes nearly glabrous. On hills and banks. April to June. General.

2. **Erigeron philadelphicus** L. Philadelphia Fleabane. Slender, soft pubescent or sometimes nearly glabrous plants, with nodding heads, perennial by stolons and offsets, mostly branched above, 1-3 ft. high. Basal and lower leaves spatulate or obovate, dentate, obtuse at the apex, narrowed to short petioles, 1-3 in. long; the upper stem leaves clasping, obtuse or acute, often clasping at the base, entire or sometimes dentate. Heads several or numerous, ½-1 in. broad, on the slender peduncles of a corymbose, paniculate inflorescence, the peduncles thickened at the summit; rays 100-150, light rose purple to pinkish; bracts of the depressed hemispherical involucre linear and mostly scarious margined. Pappus simple. Achenes pubescent. In fields and woods. April to August. General.

3. **Erigeron ánnus** (L.) Pers. White-top Fleabane. Annual erect corymbosely branched plants sparingly pubescent with spreading hairs, 1-4 ft. high. Leaves thin; the lower and basal ones ovate to ovate-lanceolate, obtuse, petioled, usually coarsely dentate, 2-6 in. long, 1-3 in. wide; the upper sessile or short-petioled, oblong to linear-lanceolate, acute or acuminate, sharply dentate at the middle, those of the branches narrow and often entire. Heads rather numerous, ½-¾ in. broad,

short peduncled; rays 40–70, linear, white or commonly tinged with purple, bracts of the hemispherical involucre hispid. Pappus double, the inner a series of slender fragile deciduous bristles, often wanting in the disk flowers, the outer a persistent series of short partly united scales. In fields. May to November. General.

4. **Erigeron ramòsus** (Walt.) B. S. P. Daisy Fleabane. A plant resembling *Erigeron annuus* but often lower and the pubescence more appressed. Basal and lower leaves spatulate, usually serrate; stem leaves linear-oblong to linear-lanceolate, mostly entire. Rays white or purplish, sometimes minute or wanting; bracts of the involucre glabrous or nearly so. In fields. May–November. General.

#### **Léptilon** Raf. Horseweed.

Annual or biennial herbs. Heads small, in a racemose, or paniculate inflorescence. Involucre campanulate, of narrow bracts imbricated in 1–2 series. Ray flowers carpellate, white, shorter than the disk flowers. Disk flowers bisporangiate. Pappus of numerous bristles, in 1 series.

1. **Leptilon canadense** (L.) Britt. Common Horseweed. Erect wand-like plants with leafy hispid-pubescent or glabrate stems, 3–10 ft. high, the larger plants much branched. Leaves often pubescent or ciliate, the basal and lower ones spatulate, petioled, incised, dentate or entire, 1–4 in. long, obtuse to acute; stem leaves linear, mostly entire. Heads usually numerous, about  $\frac{1}{8}$  in. broad; rays numerous, white, shorter than the pappus; involucre campanulate, its bracts linear, acute, glabrate, the outer shorter. In fields and waste places. June–November. General.

#### **Doellingèria** Nees. Flat-top Aster.

Perennial, branching, leafy herbs. The upper leaves large, mostly entire, acute or acuminate; lower leaves much reduced; basal leaves none. Heads numerous, in a corymbose inflorescence; involucre campanulate to hemispherical, of thin appressed, often scarious margined bracts imbricated in several series; ray flowers carpellate, white and not very numerous; disk flowers bisporangiate, white to greenish. Pappus double, the outer of short bristles, the inner of long capillary bristles.

1. Stem leaves lanceolate to ovate; heads mostly numerous.
1. Stem leaves obovate, heads commonly few.

*D. umbellata*  
*D. infirma*.



1. **Doellingeria umbellata** (Mill.) Nees. Tall Flat-top Aster. Corymbosely branched plants with striate stems, glabrous or pubescent above, 1–8 ft. high. Leaves lanceolate to oblong-lanceolate, ascending, glabrous above, pubescent on the veins beneath, membranous, acuminate at the apex, short petioled at the base, stem leaves 5–6 in. long,  $\frac{1}{2}$ –1 in. wide; the upper leaves sessile, hispid-margined. Heads numerous, in terminal compound corymbs; rays 10–15, white; bracts of the broadly campanulate or hemispherical involucre lanceolate, usually pubescent, ovate, often imbricated in 3–4 series, the outer shorter. Pappus usually white. Achenes slightly pubescent. In moist soil. July–October. Rather general.

2. **Doellingeria infirma** (Mx.) Greene. Infirm Flat-top Aster. Slender sparingly branched plants with round glabrous or roughish stems,  $1\frac{1}{2}$ –3 ft. high. Leaves entire, hispid-margined, glabrous above, sparingly hispid on the veins beneath, the lower obovate, small, obtuse, usually sessile, the upper larger, oblong-lanceolate acute, 2–5 in. long,  $1-1\frac{1}{2}$  in. wide. Heads few, about 1 in. broad, in a spreading corymbose cluster; rays 8–15, white; bracts of the broadly campanulate involucre oblong-lanceolate, obtuse, sparingly pubescent, imbricated in about 4 series. Pappus tawny. Achenes nerved and glabrous. In dry, usually rocky soil. August to September. Portage County.

**Ionactis** Greene. Stiffleaf Aster.

Low branching perennial herbs. Stem leaves numerous, narrow, entire, the basal ones none. Heads rather large and showy, terminating the stem and branches; involucre of appressed coriaceous bracts imbricated in several series; ray-flowers carpellate, violet; disk flowers violet. Pappus double, the inner of long capillary bristles, the outer shorter.

1. **Ionactis linariifolius** (L.) Greene. Stiffleaf Aster. Very leafy corymbosely branched plants with stiff tufted puberulent or scabrous stems,  $\frac{1}{2}$ –2 ft. high. Leaves linear or spatulate, spreading, one nerved, mucronate at the apex,  $\frac{3}{4}$ – $1\frac{1}{2}$  in. long, about  $\frac{1}{8}$  in. wide, sessile, those of the branches much smaller and somewhat appressed. Heads several, about 1 in. broad, terminating the branchlets; rays 10–15, violet, rarely white, with entire, dentate, or laciniate tips; bracts of the broadly

turbinate involucre linear-lanceolate, keeled, green on the back, appressed, imbricated in 4-5 series, the inner obtuse, the outer acute. Pappus bristles in two series, tawny. Achenes silky. In dry or rocky soil. July to October. Adams, Hocking.

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